
VIRIDIAN
RESOURCES L.L.C.

STRATEGIES FOR REMEDIATION OF PECONIC RIVER SEDIMENTS

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REMEDIATION STRATEGIES

- Phytoremediation: Phytoextraction
- *In situ* inactivation

PHYTOEXTRACTION

- INCO refinery sites: Ni and Co
- Oregon serpentine sites

Oregon serpentine sites

Limitations of Phytoextraction

- Too wet for cultivation
- Commercial metal accumulator may not be available
- Chelating agents: slow degradation, leaching, toxicity, cost

In situ inactivation

- Soil metals converted into persistently non-bioavailable forms
- Palmerton, PA site
- Bunker Hill, ID site

Palmerton soil bioavailable metals

$Sr(NO_3)_2$-extractable Zn

Control: 195 mg/kg

Treatment: 4.8 mg/kg

$Sr(NO_3)_2$-extractable Cd

Control: 2.0 mg/kg

Treatment: 0.033 mg/kg

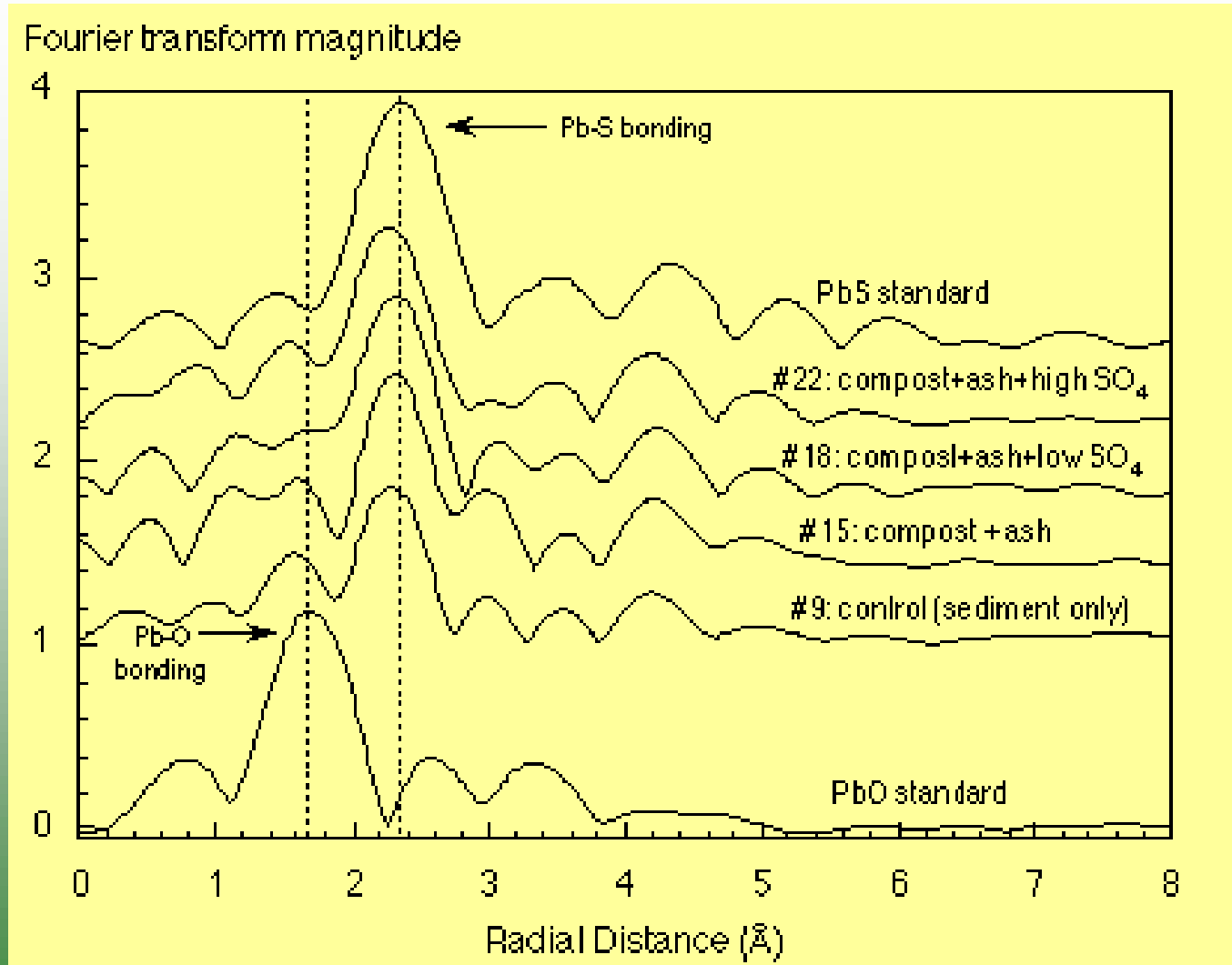

Fig. 1. Radial structure functions (RSFs) derived from Fourier transformation of lead L_{III}-EXAFS data (w=3) for contaminated sediments subjected to various treatments.
The Pb-S bonding apparent for all sediment samples indicates a dominance of Pb-sulfide.

Do the Peconic River sediments presently cause metal phytotoxicity or food chain contamination?

- Hg 10-25 mg/kg
- Ag 89-171 mg/kg
- Cu 310-1140 mg/kg
- Available: potentially toxic or able to enter the food chain
- Unavailable: compounds of Ag and Cu very immobile; also HgS

PROPOSED REMEDIATION METHOD

- ***In situ* inactivation:**
  - soil amendments and management practices
  - addition of clay and limestone

Advantages of Proposed Method

- Metals are converted into non-bioavailable forms
  - no danger to environment for a very long period
- Application of amendments without excavation
- Application of amendments under somewhat wet conditons
- Significant cost reduction
- Very limited disruption of the ecosystem


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